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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/564,889

02/07/2006

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EXAMINER

BAUMSTEIN, KYLE

ART UNIT

PAPER NUMBER

1796

NOTIFICATION DATE

DELIVERY MODE

04/14/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/564,889	Applicant(s) KRAMER ET AL.	
	Examiner KYLE BAUMSTEIN	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13-24 and 26-31 is/are pending in the application.
- 4a) Of the above claim(s) 24, 26 and 28-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-23 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 24, 26 and 28-31 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/4/2010</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

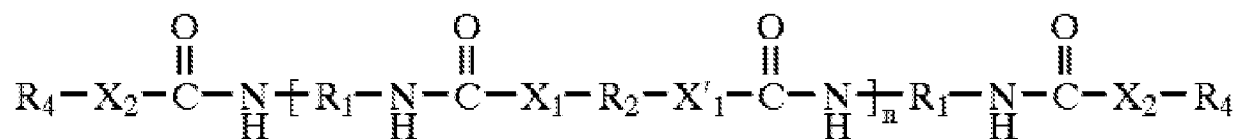
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-11, 13-17, 19-23, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. (US Pat. 6740192) in view of Keplinger (US Pat. 3148167) and further in view of Kordomenos et al. (US Pat. 4486556) and Merz et al. (US PGPub. 2002/0007003).

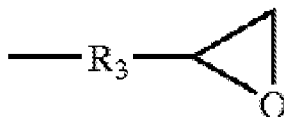
Lu teaches a method of joining electrically conductive materials by applying an adhesive to at least one such material followed by joining the substrates and subsequent curing of the adhesive. The invented adhesive composition comprises an epoxide-modified polyurethane resin, a cross-linking agent, a filler, and optionally an epoxy resin and a reactive diluent among other components (col. 2, line 33-36 and col. 3, line 24-26). The epoxide-modified polyurethane resin has the following structure:



wherein m is 2 or 3; X₁ and X₂ are either a single bond, -O-, -COO-, -NH-, or -S-; R₁ is selected from substituted or unsubstituted aliphatic, cycloaliphatic, aromatic, or araliphatic radicals; R₂ is selected from substituted or unsubstituted aliphatic radicals,

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cycloaliphatic radicals, alkoxy radicals, polyester, or polyethers; R_4 is selected from a group including the following formula:



wherein R_3 is a substituted or unsubstituted aliphatic radical, cycloaliphatic radical, alkoxy radical, polyester, or polyether (col. 2, line 40-col. 3, line 1-3). The polyurethane of the invented composition is prepared by reacting a polyisocyanate with a compound containing at least two active hydrogen groups followed by the addition of a compound having one or more epoxide groups and an active hydrogen (col. 7, line 1-10). Suitable isocyanates include hexamethylene diisocyanate (HDI), 2,2,4-trimethylhexamethylene diisocyanate (TMDI), and isophorone diisocyanate (IPDI) (col. 7, line 20-33). Active hydrogen-containing compounds include polyethers such as ethylene oxide, propylene oxide, butylene oxide, and THF optionally in admixture with reactive hydrogen-containing starter components including 4,4'-dihydroxydiphenylpropane (col. 8, line 61-col. 9, line 1-4). Epoxides to be used to prepare the epoxide-modified polyurethane have one or more epoxide groups and at least one active hydrogen which can react with the isocyanate. The active hydrogen-containing group is most preferably -OH (col. 10, line 24-32). Although Lu does not generically disclose a preferred equivalent weight of the active hydrogen-containing polymer relative to NCO-reactive groups of said polymer, the polymer used in example 1 (col. 17, line 18-29), PolyTBF 2000, has an equivalent weight that falls within the range of claim 10 in the instant application. PolyTBF 2000 is a THF polymer having a molecular weight of approximately 2000.

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Such a polymer, having 2 NCO-reactive groups, has an equivalent weight of approximately 1000 g/equivalent of NCO-reactive groups. Also, although the reference does not expressly state a preferred amount of epoxide-modified polyurethane to be added to the invented composition, the composition of example 2 comprises 13 % by weight of said polyurethane resin (col. 17, line 40). A curing or cross-linking agent is added to the invented adhesive in an amount ranging from about 1-50 weight % of the total composition (col. 11, line 30). The invented adhesive also comprises 5-95 weight % of a filler (col. 12, line 15-26). A reactive diluent may be included in the composition, of which glycidyl ethers are preferred (col. 16, line 55-67).

While Lu discloses the epoxide-modified polyurethane composition discussed above, the invented composition does not contain structural elements of formula (IV) claimed in the instant application. The polyurethane disclosed by Lu is modified by an epoxide composition selected from a group including the most preferred glycerol diglycidyl ether (col. 10, line 30-32). The reference does not disclose the use of aromatic diglycidyl ether composition to be used for this modification reaction.

Keplinger teaches a polyurethane composition containing an epoxy compound. One embodiment of the invented composition comprises an isocyanate-terminated polyurethane composition that is then reacted with a diglycidyl ether compound to provide an epoxide-modified polyurethane polymer (col. 4, line 15-25). Suitable epoxide compounds to be used to modify the polyurethane include compounds formed by the reaction of an aliphatic organic compound having an ethylene oxide unit on at least one of its chain ends such as epichlorohydrin and an organic polyhydric alcohol having 2 to

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3 hydroxyl groups such as bisphenol A and glycerol. Keplinger teaches that glycerol diglycidyl ether and bisphenol A diglycidyl ether are functional equivalents for the purpose of preparing an epoxide-modified polyurethane composition. It is *prima facie* obvious to substitute art-recognized functional equivalents known for the same purpose (See MPEP § 2144.06). Therefore, it would have been obvious to have used bisphenol A diglycidyl ether as the epoxide composition used in Lu to prepare the invented polyurethane composition. Furthermore, the use of bisphenol A diglycidyl ether as such would yield a composition containing the instantly claimed structural units of formula (IV).

Lu teaches the aforementioned composition further comprising an epoxy resin (col. 12, line 27). However, the resins disclosed do not comprise the reaction products of claim 2 in the instant application. The reference also does not disclose the addition of a thixotropic agent in the invented composition.

Kordomenos teaches a thermosetting coating composition comprising an epoxy ester resin and a blocked polyisocyanate crosslinking agent. The epoxy resins of the invention are the reaction product of diepoxide with diphenol, dicarboxylic acid, and a fatty acid (col. 2, line 58-65). The reactions occur simultaneously and such a product is therefore analogous to epoxide adduct, component (A), as claimed in the instant application. One preferred diepoxide to be used in the invented composition is bisphenol-A epichlorohydrin epoxy resin (col. 6, line 44-46). Bisphenol-A and 1,5-dihydroxynaphthalene are included in the list of suitable diphenol compounds to be used (col. 8, line 34-47). The most preferred dicarboxylic acid to be used in the

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composition are typically the dimerization reaction products of fatty acids which have from 4-22 carbons and a terminal carboxyl group (col. 9, line 43-48). Being that the reaction between all of the components occurs simultaneously, the epoxide adducts of claims 2, 3, and 4 will be present in the composition. The invented coating composition provides low VOC cured coatings that have excellent adhesion to a substrate, humidity resistance, and corrosion resistance (col. 3, line 54-66). Therefore, it would have been obvious to one having ordinary skill in the art to have included the epoxy resin disclosed in Kordomenos as the epoxy resin in the composition taught by Lu so as to increase the adhesiveness as well as humidity and corrosion resistance of the resulting coating.

Merz teaches a thixotropic agent to be used for manufacturing adhesives with migration-free properties (§ 0002). The urea-based agent is produced by the reaction of aromatic diisocyanates, such as 4,4'-diphenylmethane diisocyanate, with an aliphatic amino compound, such as butyl amine (§ 0011). The urea derivative is present in a carrier material in a concentration of 5-50% (§ 0011). Although the reference does not generically disclose a preferred amount of the invented thixotropic agent to be added to a composition, examples 2A-2D all contain approximately 25 weight % of the invented agent (§ 0034). The invented compound provides thixotropy and reduces the migration and sag of cured coatings when added to adhesives and sealants while not increasing the viscosity of the resulting composition. Therefore, it would have been obvious to have added the thixotropic agent disclosed by Merz to the composition taught by Lu to produce a migration-free, non-sag coating without increasing the viscosity of the composition.

Regarding claim 23, none of the references included above mention the low-temperature fracture energy of the invented compositions. However, being that the combination of the references produces a composition that is analogous to that as claimed in the instant application, said composition would be expected to inherently have a similar low-temperature fracture energy to that of the composition claimed in the instant application.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu et al. (US Pat. 6740192) in view of Keplinger (US Pat. 3148167), Kordomenos et al. (US Pat. 4486556), and Merz et al. (US PGPub. 2002/0007003) as applied to claims 1-11, 13-17 and 19-23 above, and further in view of Kaji et al. (PCT Pub. WO02/48235).

US Pat. 6903180 is used as an English language equivalent of the Japanese PCT publication.

The combination of Lu, Keplinger, Kordomenos, and Merz teaches the composition discussed above that has been shown to be analogous to that as claimed in the instant application. Lu discloses the use of a variety of cross-linking agents, including anhydrides such as methyltetrahydrophthalic anhydride, hexahydrophthalic anhydride, methylhexahydrophthalic anhydride, trimellitic anhydride, tetrahydrophthalic anhydride, phthalic anhydride, and nadic methyl anhydride (col. 11, lines 5-22). The prior art does not disclose the use of dicyandiamide as a cross-linking agent. Kaji teaches an epoxy resin composition and cured articles comprising said composition. The invented composition comprises an epoxy resin and a curing agent.

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The reference discloses a variety of crosslinking agents that are said to be generally known for epoxy resins. The curing agents include acid anhydrides, such as methyltetrahydrophthalic anhydride, hexahydrophthalic anhydride, methylhexahydrophthalic anhydride, trimellitic anhydride, tetrahydrophthalic anhydride, phthalic anhydride, and nadic methyl anhydride (col. 5, line 15-19) as well as dicyandiamide (col. 4, line 61-65). Kaji teaches that said anhydrides and dicyandiamide are functional equivalents for the purpose of crosslinking epoxy resins. It is *prima facie* obvious to substitute art-recognized functional equivalents known for the same purpose (see MPEP § 2144.06).

Response to Arguments

Applicant's arguments with respect to claims 1-11, 13-23, and 27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KYLE BAUMSTEIN whose telephone number is (571)270-5467. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KBB/

/RANDY GULAKOWSKI/

Supervisory Patent Examiner, Art Unit 1796